COURSE OUTLINE

(1)	GENERAL
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SCHOOL	ENGINEERING	G		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING			
LEVEL OF STUDIES	GRADUATE			
COURSE CODE	MCC204 SEMESTER Spring		g	
COURSE TITLE	Data Science Applications in Transport			
INDEPENDENT TEACHING ACTIVITIES if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits			WEEKLY TEACHING HOURS	CREDITS
			3	7,5
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE	SE TYPE Special background			
general background, special				
background, specialized general knowledge, skills development				
PREREQUISITE COURSES:	-			
LANGUAGE OF INSTRUCTION and Greek EXAMINATIONS:				
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No			
COURSE WEBSITE (URL)	https://eclass /PRD P 227/	.uth.gr/courses		

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area
- Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B
- Guidelines for writing Learning Outcomes

The course aims to provide students with the necessary knowledge and skills of the necessary tools to enable them to get familiarized with Data Science, as well as the implementation of analyses and predictions by using computational applications in applied problems of Transport.

Upon successful completion of the course the student will:

- Have understood and become familiar with one of the essential tools for data study and analysis, the open-source software R and R-studio.

- Gain specialized knowledge to solve basic problems using programming.

- Can integrate and analyze data available in external sources and various types of formats.

- To design research objectives and questions.

- Be able to apply hypothesis testing and critically evaluate results.

- Can apply and explain methods of regression, correlation of variables, methods of data clustering and classification, and basic methods of predicting data values.

- Perform teamwork to coordinate activities and manage progress in the delivery of a research project.					
- Can interpret the results of analyses to generate research insights					
Use the shifts to sugth seise windling	generate research insights.				
- Has the ability to synthesize, visualize a	and evaluate data and results through simple				
and complex graphs.					
General Competences					
Taking into consideration the general competences that the Supplement and appear below) at which of the following d	e degree-holder must acquire (as these appear in the Diploma loes the course aim?				
Search for, analysis and synthesis of data and information.	Project planning and management				
with the use of the necessary technology Respect for differe	ence and multiculturalism adapting to new				
situations	Respect for the natural environment				
Working independently	sensitivity to gender issues				
Team work	Criticism and self-criticism				
Working in an international environment	Production of free, creative and inductive				
Production of new research ideas	 Others				
Analysis and synthesis of data using the necessary	/ technologies.				
Decision making.					
Teamwork.					
Exercise of criticism and self-criticism.					
Promotion of free, creative and deductive thinking.					
Use of new technologies to solve problems.					
Generating new research ideas.					

(3) SYLLABUS

The open-source software R (introductory concepts, basic programming skills, applications of the language in data analysis), Descriptive Statistics (distributions, basic descriptive measures, hypothesis testing), Types of variables - Correlation of variables (Pearson's correlation coefficient, chi-square test), Visualization of data and results - Graphs, Types of regression (Linear, Logistic, etc.), In-depth data analysis - Prediction.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Distance learning		
Face-to-face, Distance learning, etc.			
USE OF INFORMATION AND	Use of slides.		
COMMUNICATIONS TECHNOLOGY	Use of software.		
Use of ICT in teaching, laboratory	Use of the Eclass environment for the distribution of course		
education, communication with students	material, presentations and communication with students.		
TEACHING METHODS	Activity	Semester workload	
TEACHING METHODS The manner and methods of teaching	Activity Lectures	Semester workload 3x13=39	
TEACHING METHODS The manner and methods of teaching are described in detail.	Activity Lectures Study and analysis of	Semester workload 3x13=39 57	
TEACHING METHODS The manner and methods of teaching are described in detail. Lectures, seminars, laboratory	Activity Lectures Study and analysis of bibliography	Semester workload 3x13=39 57	
TEACHING METHODS The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis	Activity Lectures Study and analysis of bibliography Semester project	Semester workload 3x13=39 57 50	

clinical practice, art workshop, interactive teaching, educational	Exams	3		
visits, project, essay writing, artistic creativity, etc.				
The student's study hours for each learning activity are given as well as the hours of non- directed study according to the principles of the ECTS	Course total	179 hours		
STUDENT PERFORMANCE EVALUATION	The evaluation of students is carri	ed out through:		
Description of the evaluation procedure	-A semester group project (60%) including a written report and a group presentation. It describes the intended research project in terms of objectives, analytical framework, and also summarizes			
Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short- answer questions, open- ended questions, problem solving, written	the research project in terms of contribution to existing literature, results of the research findings and conclusions. -An end-of-semester written examination (40%) that includes a demonstration of proficiency in a set of techniques.			
work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other	The written examination will include: - Multiple choice questions. - Open questions.			
Specifically-defined evaluation criteria are given, and if and where they are accessible to students.				

(5) ATTACHED BIBLIOGRAPHY

-Suggested bibliography: -Field A., Miles J., Field Z. (2012). Discovering Statistics Using R. SAGE Publications -Wickham H., Grolemund, G. (2017). R for Data Science. O'Reilly

- Related academic journals: -Journal of the Royal Statistical Society Series A, B, C

-Accident Analysis and Prevention -Transportation Research part A, B, C, D, E -Journal of Safety Research -Traffic Injury Prevention

-Analytic Methods in Accident Research